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FOLLOW-THRU

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In golf, the importance of the "follow-thru" is well known. It has much to do with the refining of the drive and the direction the ball takes. The lack of a good "follow-thru" may mean the dubbing of the ball, a frown on your face and a smile on that of your opponent's.

The "follow-thru" in children's thinking is equally important. This seems especially so in geographical reasoning. For it is here that the individual is establishing generalizations of human living which form the basis for his attitudes, beliefs, and further thinking about social problems.[1] Yet we have numerous evidences of geographical reasoning that has had a good start, but stopped just when "the ball was hit." The result is the accumulation of erroneous ideas of geographical half-truths, aside from the perpetration of an illogical and biased method of thinking.

AUSTRALIA IN TWO DAYS

In a recent issue of a school journal,[2] there appears a teacher's account of a "book" on Australia written by a sixth grade class. It is a tribute to the teacher's professional alertness. The motivating factor was the occupational visit to the classroom of a window washer, who had once spent six months in Australia, and who was prevailed upon to tell the children of his travels.

The teacher writes, "Our Australia unit was completed in two days instead of two weeks, because the human element had entered into it."

The "completed" book contains, "Once in three years they

[1] "In all the work of the social studies, we have been pointing out that the objective is to develop understandings, see laws and get firm hold of the principles that control social living." L. C. Mossman. Teaching and Learning in the Elementary School. Houghton Mifflin, 1929.

[2] M. A. Schmidt. Experiences from the Field, *Chicago School Journal*, Sept.-Oct., 1937, Vol. 19, Nos. 1 and 2.

have rain in summer. When they have their rain it lasts only a few minutes, and then it drenches everything. . . . The natives are so ignorant. . . . The birds are plentiful. . . . Sheep are so plentiful in Australia you can buy one for a quarter."

The entering wedge of "human element" was a casual observer of half a year on the southern continent; a land approximately the size of the United States, and with its own diverse elements.

THE ELEPHANT IS NOT A SNAKE

We, in the States, are often delightfully amazed and, fortunately, amused at the comments of European visitors who spend time in our country and then return to Europe to publicly pass on their observations. Their experiences in one or several sections of the United States, their contacts often with relatively few occupational or social groups, may form the basis for broad generalizations about all of our forty-eight states and one-hundred-thirty million people. The varied descriptions of the elephant by the seven blind men, each of whom had grasped a different part of the animal, seems directly to the point. The trunk may suggest a snake, the ear a leaf, and the leg a tree trunk, but the elephant obviously is none of these.

A look at a rainfall map of Australia shows decided differences between the east and west coasts. The seasonal influences of the south-westerlies upon certain parts of southern Australia are to be noted. It would seem of value to investigate the "why" of these differences and the respective influences upon the life of the people in these regions.

That "the natives are so ignorant" seems to call for modification in the light of the evaluating standards employed. Surely sympathy and understanding thru knowledge of the native's life and environment played little part in arriving at that generalized statement.

In the main, the children's "book" seems a straightforward report of a traveler's story, with little or no verification of human observations. Few geographical principles seem forthcoming. Yet the interest of the children in what they did is assumed as evident. They "hit the ball," but failed to "follow-thru" for a clean smashing blow.

THE "PRE" AND "AFTER" PROCESS

It is possible these children would have relished the opportunity to verify the content of their "book," if for no other reason

than pride in an accomplishment well-done. They would thus begin to appreciate that conclusions must be based upon as much evidence as possible, and be secured from various sources. They would feel the need of checking their generalizations to see that they really apply to the area under consideration. Too, the importance of noting exceptions and understanding the reason for them would thus become apparent.

The procedure is continuous from a "pre" to an "after" process. In the first instance, there is the securing by the child of all the available pertinent facts. We want him to become increasingly aware of the possibilities and extensions of the situation with which he is dealing. After the establishment of the tentative generalization, the child needs to realize more and more that this is not the final step, but only a summing up process. The "ball" has been hit, but the club must swing thru. For it is important that the pupil apply his generalization, testing it by application to other and similar situations.

On this point, Dewey[3] says, "The pupil is encouraged to form on the basis of the particular facts, a general notion, a conception of how they stand related; but no pains are taken to make the student follow up the notion, to elaborate it, and see just what its bearings are upon the case in hand and upon similar cases. . . . But a complete and integral act of thought requires that the person making the suggestion (guess) be responsible also for reasoning out its bearings upon the problem in hand; that he develop the suggestion at least enough to indicate the ways in which it applies to, and accounts for, the specific data of the case."

THE PROFESSIONAL CHALLENGE OFFERED

Recently at an exhibit of the tangible results of the activity work of a model school there was displayed a number of large maps of New York State made by seventh and eighth grade pupils. The underlying idea seemed admirable. The pupils were to gain an understanding and appreciation of area, topography and location by such map construction. A cursory examination of the maps revealed such novel concepts as the Mohawk River suddenly stopping before reaching the Hudson, and the city of Buffalo located on Lake Ontario. The Genesee River apparently rose near Rochester and ended awash in the State of Pennsylvania.

Yet, on the whole, the maps, brilliantly and decoratively colored,

[3] How We Think. Heath & Co., Chicago, 1910, p. 96.

made a very imposing and pleasing appearance. In that respect they represented much patience and labor and, incidently, wobbly observation and thought.

A recent visit to a seventh-grade classroom found the children discussing deserts. There seemed to be one universal physical characteristic of deserts—they are all covered with sand. They possess oases and camel caravans. There was no mention of rocky deserts or of high-latitude deserts. Little concern was evident with the relationships of botany, zoology and human geography to the meaning of the term, desert. The criteria of action seemed to be a generalized notion of the Sahara. Yet the pupils were in the process of stating a generalization upon which to predicate future geographical thinking.

It is not at all intended here to select out for inspection isolated bits of faulty educational practices. Professionally, the hope is to call attention to the need of more careful supervision of the thinking process of children when considering geographical data, so that the generalizations they make their own may be well justified in the light of available scientific information, and thus possess a high degree of probability. For it is these generalizations of the child which are his working tools in social action.

CONCLUSIONS

1. Geographical thinking is essentially the establishment of principles of relationship between man and nature.

2. In turn these generalizations become the thought tools of the individual in social action.

3. The importance of acquiring working generalizations that possess a high degree of probability is thus evident. Also important is the will to change them in the light of new and sound evidence.

4. Our job in school is to see that pupils have access to an extensive source of pertinent facts, and help the pupils to see the relationships involved.

5. Children should be aided and abetted in applying their discoveries to thus test the validity and reliability of their tentative generalizations.

6. The foregoing (No. 5) is often omitted, with resulting faulty thinking. Thus an essential aim of social studies teaching and learning may go seriously astray.

. . . . .

In golf, tennis, or mental gymnastics, the "follow-thru" seems vitally important.

THE GASPÉ PENINSULA

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A relatively little known but extremely interesting section of North America is the Gaspé Peninsula. Each year tourists are going in increasing numbers to this land of scenic beauty and quaint customs. Because of the long period of isolation the manner of living and the language of the people have changed but little since their ancestors arrived from France three or four hundred years ago. Commercialization has not, as yet, ruined the true nature of the area as a tourist resort but with the passing of each year the tourist will leave his imprint upon the region and its people.

The Gaspé Peninsula is the eastward extension of the Province of Quebec which lies between the St. Lawrence River on the north and the Bay of Chaleur on the south (Fig. 1). The topography of the peninsula is quite mountainous, being a part of the Folded Appalachian System so well known in the eastern United States. Bays and inlets are found between the roughly parallel mountain ridges where they reach the coast so that the Gaspé resembles a person's lightly closed left hand thrust out into the ocean.

There are few places in the world where the peripheral pattern of population is more pronounced. In all but the Matapedia Valley, which really marks the western end of the peninsula, the villages are all located very near the sea. Only one village, St. Elzear, is as much as twelve miles inland. The central part consists of forest-clad mountains which rise to a more or less uniform height of three thousand to four thousand feet, separated by narrow canyon-like valleys. The fact that forests cover 80 per cent of the surface of the entire peninsula indicates the lack of human development in the interior. This is further emphasized by the fact that roads leading to the interior are entirely lacking and there is only one trail to the central part of the peninsula. It follows the Cascapedia River. Altho some deposits of lead and zinc are found in the upper reaches of this river there is little definite knowledge as to the ex-

* Materials published by the Quebec Tourist Bureau have been used to supplement data derived from five week's field work during the spring and summer of 1938. The writer wishes to acknowledge the invaluable assistance of his wife, Charlotte Spillman Strain, whose careful driving made possible the taking of copious notes during the reconnaissance survey.

tent of the deposits and as yet they are not commercially worked. The two greatest resources are the forests in the interior and fish in the adjoining waters.

The oldest industry of the peninsula is fishing, having been carried on by the Indians long before the coming of the first white man. So productive were these waters that Briton and Norman

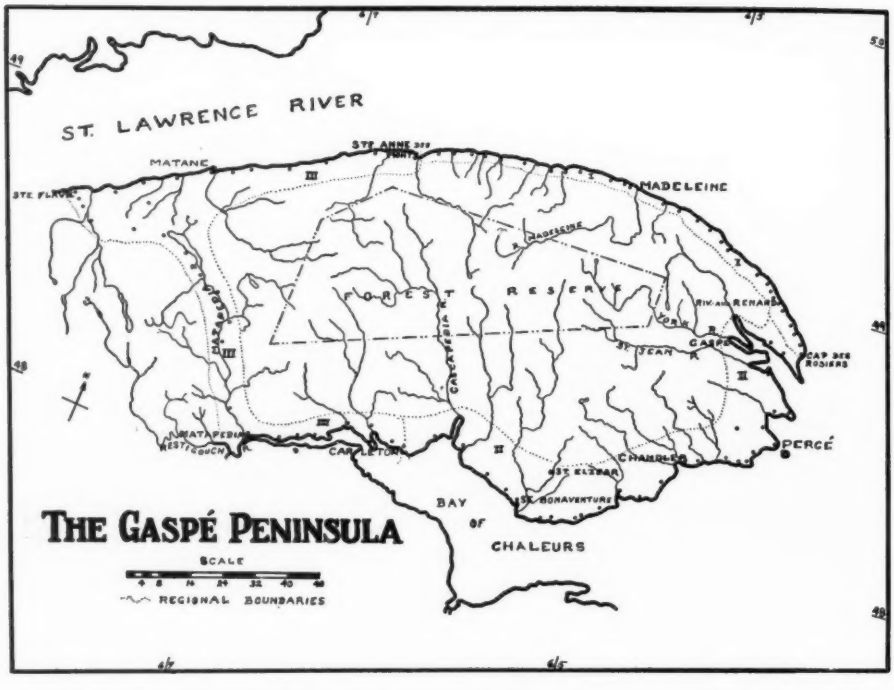

Fig. 1. The dots around the coast represent villages, the names of which have been omitted for the sake of simplicity. Three regions are shown—I. The Northeast Shore, II. The Southeastern Coastal Region, III. The Western Lumber and Farming Region. (Base map from Quebec Tourist Bureau)

fishermen frequented this area before Cartier made his first voyage to America. Fishing has persisted as the leading occupation along the Gaspian coast to the present time. Altho fish abound in the rivers, they are considered only for sport, and commercial fishing is limited to the sea. Codfish are the most important, accounting for more than 70 per cent of the total value of the catch. Most of the remaining 30 per cent is provided by mackerel, herring, salmon, lobsters, and smelt, in the order named.

The fishing season begins in May when herring and other small

fish are caught for bait. The catch of cod begins in June and continues until November. Altho cod are caught in all the waters around the peninsula, they are especially abundant around the eastern end, from Matane on the north shore to Carleton on the Bay of Chaleur. Cod are sold both as dried and fresh fish, the countries around the Mediterranean Sea providing an important market. The average annual catch of cod is in the neighborhood of one hundred million pounds altho the quantity varies from year to year.

During the month of October many of the fishermen leave the

Fig. 2. A log boom in the Restigouche River. Each log has its owner's brand placed on it before it is floated down the river. During the summer lumber-jacks sort the logs so that each owner gets his logs. The logs on the left side of the picture have been sorted.

sea and along with sawmill hands and farmers go into the forest to spend the winter working in the lumber camps cutting logs and paper bolts. The first snow usually falls during this month but a permanent snow cover does not exist until about the first of December. The logs are cut and piled up along the streams to await the spring thaws and the resultant rise in the rivers. By the middle of April much of the snow has melted and the logs are floated to the sawmills and log booms located at the mouth of the streams (Fig. 2). With the coming of spring and summer the men return to their fishing, to sawmills, or to their farms.

Winter is a busy time for the women. Besides caring for the great number of children found in each home, the task of spinning

wool and the weaving of cloth and blankets occupy much of their time. Knitting socks, gloves, sweaters, and caps and the making of rugs are all included in the art of homemaking. The introduction of the mail order business is, however, partially liberating the women from some of these time-consuming tasks and a pleasant evening is sometimes spent perusing the pages of a mail order catalog before the large open fireplace. During the summer, in addition to the usual cares of the home, they help prepare fish for market, sell to tourists the blankets, rugs, and novelties which they and their neighbors made during the long and cold winters and bake bread for sale in the ubiquitous outside ovens (Fig. 3).

Fig. 3. A typical outside oven. Fire is built in the oven and kept burning until the stones of which it is made are very hot. The fire is then removed and the bread or other foods to be baked are placed in the oven. The heat in the stones does the baking. Note the large loaves of bread by the oven.

Taken as a whole, fishing and lumbering are the most important human activities but the degree of intensity varies from place to place. To more accurately describe the activities in this peripheral belt, three regions will be discussed—I. The Northeast Shore, II. The Southeastern Coastal Region, and III. The Western Lumber and Farming Region.

I. The Northeast Shore

Along the Northeast Shore the coast line is characterized by slight indentations between the many spurs of the Shickshock Mountains which extend into the St. Lawrence estuary and form frowning cliffs and headlands eight hundred to one thousand feet high. Because of the shallowness of these bays, both as to depth of water and depth of indentation, there is not a single important harbor between Ste. Anne-des-Monts and Cap-des-Rosiers. Nowhere are the mountains far from the sea and the rivers are all short, having small drainage basins (Fig. 1). Therefore few evidences of extensive lumbering are seen. The Madeleine River is the only stream with a relatively large drainage area and it is interesting to note that the only pulp mill of the Northeast Shore is

located on this river, seven miles back of the village of Madeleine. The mill, however, has not been in operation for the past few years altho it does supply electricity for the village giving the residents of Madeleine an opportunity to boast that it is the only village on the entire north coast which has electricity.

The steep slopes and the relatively sterile soil effectively reduce the participation in agriculture to a minimum. Individual farmsteads are entirely lacking, the people all living in small villages at the head of the bays. Frequently even gardens are entirely

Fig. 4. Riviere Renard, a typical fishing village at the head of the bay.

lacking and from 50 to 100 per cent of the population depend upon fishing and its related industries. The villages are all quite similar, consisting of a line of houses along the sandy beach (Fig. 4). On a knoll overlooking the village and facing the sea is a church which not only serves as a spiritual uplift to the village but also as a guide to the fishermen at sea since it can be seen above the other buildings. Altho education is not compulsory, each village has its school. Without exception there is a shrine in each school yard showing the great influence of their religious faith in their daily life. People of French ancestry predominate and French is the language spoken in the home, school, and on the streets. Most schools conduct one class in English but the fact that few students have an opportunity to use it in everyday life makes it rather ineffective altho it is only a few miles from the United States. Riding at anchor in the bay adjacent to each village is the fleet of small fishing vessels while

on shore are racks for drying the fish. With improved methods of transportation, however, companies from Quebec are sending trucks out to buy the fresh fish each day. Since most villages are located near the point where a stream enters the sea, each town has its bridge. It is not surprising to find the large picturesque bridges made of wood in this land where lumber is abundant and iron and steel are expensive and difficult to get (Fig. 5).

The steep mountain spurs which separate the villages have formed an effective barrier to transportation and only within the

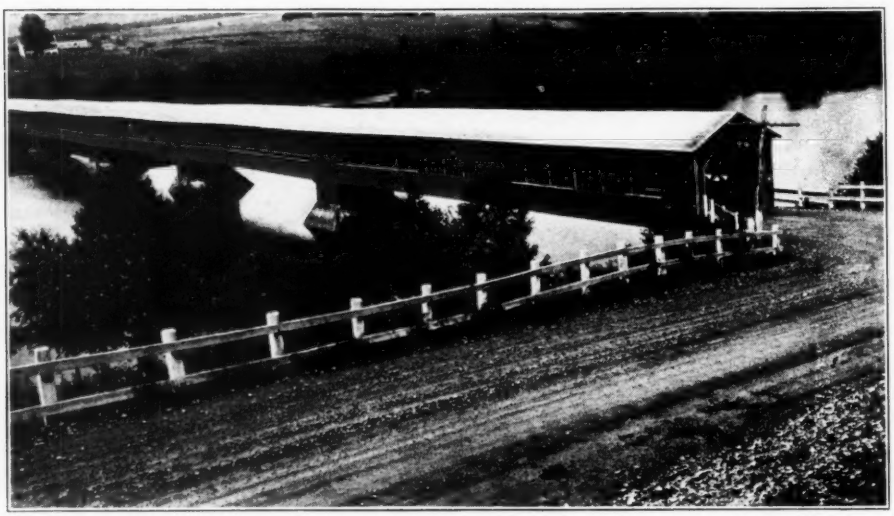

Fig. 5. Picturesque covered bridges are numerous.

past few years has a motor road been constructed completely around the peninsula. Because there was little to exchange between the villages roads were not needed, the necessary trade being carried on by the easier water route. The absence of roads and the scarcity of agricultural land for the production of feed crops led to a limited development of the livestock industry. Dogs were early used as beasts of burden here since they could eat fish, the most easily provided food. Hence today there is a strange mixture of transportation, the high powered automobile of the tourist and the ever present dog carts of the natives. Along some parts of this coast where agriculture is not entirely absent, occasionally an ox or a horse provides the motive power (Fig. 6).

II. The Southeastern Coastal Region

By the time the port of Gaspé is reached some important changes in the landscape may be observed, thus giving rise to The

Southeastern Coastal Region. While this region has many characteristics in common with the Northeast Shore, it is the differences that make it outstanding.

Here the bays are more deeply indented giving rise to better harbors and larger villages. The mountains are much farther from the sea, in places ten to twelve miles inland, which provides more land suitable for cultivation. Where the spurs do come to the ocean they are subdued and separated by broad, gently rolling valleys. Only at Percé do cliffs approach the sea with comparable magnitude to those on the northern shore. Thus along the southeast shore it is possible for agriculture to become an important element in the human activities.

Fig. 6. Altho the driver of the ox cart may speak only French during a conversation, when he wants the ox to stop he uses the good old English word "Whoa." This cart is loaded with dried fish being taken to market.

Dairying is the chief type of farming, a fact readily observed from the number of cattle, the extent to which feed crops and hay are dominant, and the presence of butter and cheese factories in the villages. The butter and cheese produced in this region are shipped to Quebec and Montreal by the railroad which extends along this more level coastal belt to Gaspé. Individual farmsteads are typical with long ribbon-like fields (Fig. 7). Because of the narrowness of the farms the houses are relatively close together. Silos and modern dairy barns, features usually associated with dairying, are generally absent.

The production of field crops, especially oats and hay, requires the use of draft animals. Oxen and horses are quite common. The oxen, however, are worked singly rather than in pairs. Occasionally dog carts are seen but much less frequently than on the north shore. Here agriculture is closely related to fishing. During the latter part of May and early in June large quantities of herring are spread on the fields for fertilizer. During that time all members of the family help scatter the fish. Large wooden pails are used to

carry the fish which usually are spread by hand. It is not uncommon to see whole fields glistening as the sun strikes the silvery scales.

In addition to dairying, large quantities of vegetables are produced and sold to the lumber camps in the interior for winter use, or are canned at the local canning factories. A reflection of the importance of lumbering in the interior is much more pronounced in this region than along the northern coast since the streams which flow thru this region are much longer and have larger drainage

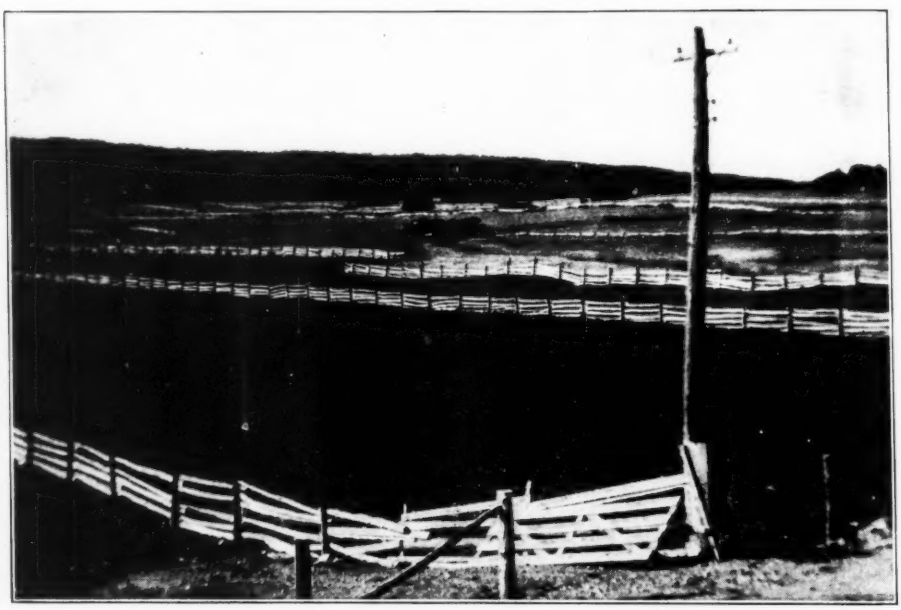

Fig. 7. Narrow, ribbon-like fields separated by pole fences are typical in the parts of the peninsula where farms are common. (Photo by M. E. Gibson)

basins. Thus most of the timber, even that cut by the men of the Northeast Shore Region, is floated to the southeast during the spring thaws. Sawmills and pulp mills are important industrial features in many of the towns and villages. The most important pulp mill is at Chandler.

English is commonly spoken along this coast, being the language used in schools, business, and in the home. However, French is not uncommon.

Fishing increases in importance from Carleton eastward to Percé, the latter being the chief fishing port on this coast. Percé, however, is most widely known as a resort town. The presence

of mountains, islands, the sea, and fishing enterprises, attracts many tourists and artists to Percé.

The village of Gaspé, located on a narrow neck of land which extends into the spacious harbor at the mouths of the Yarmouth and York rivers, is the most important commercial center and entrepôt port on the peninsula. It is the eastern terminus of the Canadian National Railway and also carries on an important coasting trade with the north shore. The harbor is deep and well protected from storms making it one of the finest summer harbors in the world.

III. The Western Lumber and Farming Region

The Western Lumber and Farming Region includes the Matapedia Valley and the south shore eastward to Carleton and the north shore eastward to Ste. Anne-des-Monts. As the name indicates, agriculture and lumber operations are the dominant activities. While fishing is not entirely absent, it is insignificant when compared with the other two regions. This is especially true on the south shore and in the Matapedia Valley. Almost every village has its sawmill and the lumber activities at Matane are especially pronounced. The sawmill at Matane provides employment the year round to about two hundred and fifty workmen. Large quantities of pulp wood are shipped from this port each year and in the upper reaches of the Matane River approximately forty thousand cords of pulp wood are cut annually. Much of this wood is shipped up the St. Lawrence River to Quebec and Montreal. Log booms are present in many of the rivers. The one on the Restigouche is reported to be the largest log drive in Eastern Canada.

Individual farmsteads are found thruout this region and considerable attention is paid to the livestock and dairy industries.

Summary

Surrounding a forested mountainous interior which is devoid of permanent human imprint are three regions: The Northeast Shore where fishing predominates, The Southeastern Coastal Region where agriculture and forest activities exist in addition to fishing, and The Western Lumber and Farming Region. Thus within the Gaspé Peninsula there are striking contrasts. The simplicity of life, and the picturesque scenery are particularly interesting to tourists.

EQUIPPING A HIGH SCHOOL GEOGRAPHY ROOM

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The widespread introduction of geography into the curricula of the high schools of the nation during the past decade has confronted many teachers and administrators with the problem of adequately equipping their geography rooms.

Because of the fact that geography courses vary greatly in content, duration, and grade level at which they are offered, no arbitrary list of equipment can be set up as basic for all schools. Any list suggested must possess flexibility in order to provide the choice necessary to meet the needs of the individual school.

The purpose of equipment in a geography room is to expedite, enrich, and clarify the geographic learning. Its value is directly proportional to the amount of use to which it is put. The essential geography equipment may be classified under the headings of: maps, atlases, and globes, classroom library, exhibits, furniture, and visual aids.

MAPS, ATLASES, AND GLOBES

Maps are, perhaps, the best single source of geographic information. They coordinate ideas related to the earth; they give precision to space relations; they serve as a shorthand description of the earth. The signs and symbols of the map language have to be learned, but once learned they make it possible for students to acquire at a glance a vast amount of geographic information which would require volumes to record in words.

The minimum map equipment for a high school geography course should include maps of the home state, the United States, and the World. The wall maps suggested are:

For the World: a physical-political map, seasonal rainfall maps, seasonal temperature maps, a vegetation map, and a map of population density.

For the United States: a physical-political map, and seasonal rainfall maps.

For the Home State: a physical-political map.

Additional maps should include blackboard outline maps of the home state, the United States, and the world. It is suggested that outline desk maps and newsprint wall maps should be available for student use at all times.

After these minimum requirements have been met, other maps

of the United States, the world or of the continents may be secured. Further expansion depends upon the character of the course. Manuscript maps, of either teacher or student construction, should occupy an increasingly important place in the equipment provided. Such maps are especially valuable, for they show facts not found in the atlas, the textbook, or in other forms available to students; they can be made in direct response to the needs of the course, and they permit a broad expansion of the map equipment with a minimum of cost.

Atlases rank with or above wall maps in their instructive value. It would be ideal if each student had open before him on his desk, an excellent atlas, thru whose pages he could turn with practised hand, to maps of relief, climate, vegetation, population density, and earth resources, as the class discussion brought forth their need. However, it is only in rare cases that students are so well provided. Generally, atlases are used in the manner of a dictionary, for reference, only in case the wall maps or the text maps do not carry the information desired.

Certain it is that an atlas of appropriate grade level contains most of the essentials of the geography course. Students have to be trained in the use of the atlas before it can be used, either to replace or to supplement the wall map. The teacher must decide what teaching is most effective thru the use of wall maps, which focus general attention on detailed instruction or on a general over-view of the work; and what instruction is best adapted to student use of atlases to search out the more detailed information.

The globe comes before the wall map, and even before the atlas, in showing the true relations of one part of the earth to all the rest. It is by means of the globe alone that we see the physical unity of the world.

The globe, then, should be used to show simple, big relationships, like those showing the relative areas, shapes, and locations of the continents and oceans, and the resulting trade routes. It should be large enough to be seen clearly by each member of the class, and should be a blackboard globe on which may be shown the different world distributions as they are taught.

It is true that teacher opinion differs greatly on the type of globe desired. The choice depends, primarily, on whether one is well enough supplied with wall maps to sacrifice the desirable greater detail of physical-political globes, for the opportunity to use the blackboard globe in demonstration work.

The Classroom Library

No single textbook can satisfactorily meet the varied demands of geography courses, which range in character from economic and political to courses concerned primarily with elements or principles of geography. However, opinion generally favors the use of more than one textbook, one book being considered a basic text, and one or more other books being used to supplement the first. There should be a sufficient number of copies of each book used to provide each student with a copy of the basic text, and to permit him to have continuous access to the secondary books.

In addition to supplementary high school books, appropriate books of college level should be made available for the two-fold purpose of serving as a challenge to the teacher, and as a means of extending and enriching the information of superior students whose intellectual curiosity has been aroused, but not satisfied, by the high school books. On the other hand, elementary school texts should be made available for the general use of the slower students, and for special use of the entire class in the search for more graphic or pictorial material, for elementary texts are much richer in maps and pictures than are the high school texts.

Additional supplementary text material should be supplied in the form of magazines, bulletins, reports of state planning commissions and of the National Resources Board, yearbooks of government departments, reports of the Foreign Policy Association, and other similar publications containing current information which is not available in other sources.

It is generally believed that ease of access to supplementary reading material as well as to other essential equipment is one of the chief factors in determining the functional value of the equipment to the course. Thus, it is believed that the classroom library should contain the principal part of the reference books used, and the general library should house the geographic novels, the travel books, and all other geographic books which might be used by other social science or science classes. An additional reason for having the reference books in the classroom library is found in the fact that most high school students are not proficient in library research work without the guidance of the teacher of the course.

Exhibits

Exhibits, as referred to in this discussion, may be thought of as consisting of displays of earth resources, products, models which

portray elements of natural or cultural environment, and any other similar material used to develop a clearer understanding of the information presented in the geography course. The sum total of exhibits constitutes the geography museum of the school. The museum should be a working unit, never static, but in a constant state of growth. The character of the course will determine the type of exhibits desired by the teacher. The material selected and displayed must have geographic significance, otherwise there is likely to be more junk than geographic aids in the museum.

It is considered highly desirable that much of the exhibit material be of student origin. If there is a mineral collection, part of it may be purchased but, in the glaciated regions of the country especially, much of the collection should be supplied by the students. The practice of exchange of specimens or products among schools offers an easy and interesting method of building up a museum.

The list of exhibits possible of student construction is practically unlimited; maps, charts, grafs, and sketches, either large enough for wall display, or small enough for projection, are excellent projects. Models of land forms and small dioramas offer other possibilities.

It is hardly necessary to remind teachers that student-originated and executed exhibits, properly credited and displayed in the geography museum of the school, constitute one of the most effective devices for motivation possible. There is an opportunity for the student to do something from which tangible results can be seen, and there is the natural appeal to student pride in having his work become a part of the teaching equipment of the school.

FURNITURE AND APPARATUS

Under the heading of room furniture and apparatus may be grouped all of the seating equipment, whatever physical apparatus is used in the course, dark window shades, the display cabinets for exhibits, and all the cabinets necessary for storing and for keeping in systematic arrangement the teaching and testing material of the course.

Most teachers prefer tables and ordinary straight chairs for seating. Tables large enough for two or more students and having natural wood or light-colored composition tops are most in favor. Tables permit students to work in groups when desired, and provide adequate work space for large-size project work.

The size, form, and number of display cabinets for exhibit material must be determined to fit the needs of the individual school. It is suggested that there be at least two display cabinets, one for earth resources and products, and another for land form models and dioramas. A third small cabinet may be used very effectively for the display of material directly related to the work immediately under discussion. Sliding doors with large panes of glass are advisible for all cabinets. The shelves need not be wide, but should be numerous, adjustable, and capable of tilting forward for greater visibility.

The built-in shelves and drawers, used for storing exhibit or class material, should be capable of expansion in number to satisfy the growing needs of the course. Two cabinets, especially, are recommended; one consisting of a series of large, shallow drawers, for use in storing large-size flat work; another consisting of at least one-hundred 3″ by 12″ by 15″ pigeonholes, for use in storing teaching and testing materials and the master stencils. This second cabinet should be provided with a lock.

Racks for wall maps can be made easily and inexpensively in a number of ways; perhaps the easiest way is to drive spikes or pegs thru supported uprights. Another excellent manner of storing wall maps is to equip the ceiling and walls of any available small closet with hooks, and suspend the maps by their end brackets on these hooks. If the geography room is equipped with projectors, there should be storage space for them provided with a lock.

The apparatus may include such items as running water, weather map service, a set of thermometers, a barometer, a hygrometer, an anemometer, a rain gauge, block diagrams, topographic maps, and numerous other aids. Part or all of this equipment will be considered basic by many teachers. In some cases part of the material will not have to be purchased, but can be used in conjunction with physics or other science classes.

Visual Aids

Broadly speaking, visual aids include all equipment which stimulates learning thru visual means. Actually, maps are among the principal items of such equipment; however, as has been indicated before, maps rank with textbooks as equipment of primary importance. Visual aids in the form of graphic and pictorial material should be available to supplement all oral instruction. The material should be changed to keep pace with the course, and should

not be considered satisfactory merely because it combines an ornamental quality with general geographic information. It should be specifically related to the particular phase of work under immediate discussion thru carefully planned integration.

An adequate program of visual aids should include moving pictures, both silent and sound; still pictures on slides or mounted for opaque projection, stereographs, bulletin board displays, blackboards, and large framed pictures for the room. If moving pictures, filmstrips, or slides are rented or borrowed from an outside source, they should be scheduled to fit accurately and most effectively into the course. Only time and experience can guide a teacher in the selection of the most useful moving pictures and slides. Travel films are not particularly satisfactory, as a rule, for they are made chiefly for entertainment or propaganda, usually by people who know little about teaching. Many of the documentary films of the national government are excellent; however, some films, regardless of the source, are so much more valuable than others that a simple filing system of comments on films previously used should be referred to when making schedules for future use.

Thruout the country there are many public institutions which have excellent libraries of films and slides, available to schools on an inexpensive rental basis, or free of all cost except the expense of transportation. In addition to these public sources such as university and college extension branches, public libraries and museums, there are many private and semi-public organizations which have libraries of visual aids, well adapted to geography teaching, and at our service with very little cost.

If the school has only one projector, it will probably be used more in the geography room than in any other, and so it should be stored there. If other courses schedule rented visual aids, the program should be cooperatively scheduled so there will be no conflicts, and it should be scheduled early enough to secure the material as it is needed.

Slides, opaque projections, and stereographs owned by the school should be organized for convenience into units of instruction matching those of the course. The material mounted on the bulletin boards should be displayed in a systematic manner so that a board or a section of a board will give one teaching impact.

The blackboard is definitely part of the visual equipment. The great advantage of the blackboard is that on it things may happen; on it a map or a picture may be built up in front of the class, with

or without the assistance of the class. The blackboard is not the place for the teacher to display maps and pictures which have been drawn with elaborate care beforehand, or with constant reference to notes; rather, it is a place for comparatively rough work, not worth keeping, yet absolutely essential in enriching and clarifying the work of the course.

Large pictures, especially of scenes portraying the elements of natural environment, should be placed in the geography room for both educational and inspirational value. Such pictures, high in quality and excellent in teaching value, may be secured without cost from railway and steamship lines, both at home and abroad. They may be framed, or less expensively mounted on heavy cardboard by means of gummed tape. To have teaching value the pictures must be looked at by the students; this means that they should not be hung permanently, but the entire series should be displayed in rotation.

Any school can be equipped with a generous supply of carefully selected material for visual instruction with very little expense. If money is not available for talking pictures, for expensive projectors, or for libraries of films or slides, then the alert teacher with a pair of shears, a pot of paste, and some mounting board, can turn to the daily paper, to magazines, bulletins, and circulars from railway and ship lines. The problem is not in finding pictorial material; it is in making a careful selection from the world of illustrative material available.

Conclusion

In conclusion, the expenditure of a large sum of money is not necessary, for it is not expensive or elaborate equipment that characterizes a well-equipped geography room. However, the minimum essentials in equipment should be met, then the imagination, ingenuity, and initiative of the teacher should make possible an equipment expansion program within the means of any school, and suited to a geography course of any character, duration, or grade level.

SOME COLLEGE-LEVEL EXERCISES IN CLIMATOLOGY

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For the past several years the author has felt the need of concrete laboratory exercises to be used as supplementary material in teaching the basic principles of climatology to college classes in elementary geography. Unfortunately, nothing other than generalized exercises could be found. As a result a series of laboratory exercises or work sheets was devised, the basic purpose of which is two-fold: (1) to make the student *independently* discover some of the climatic principles he has committed to memory from his text or from his lecture notes, and/or (2) to make him *use* these principles in *concrete* illustrations.

While the series of exercises is by no means complete, it is felt that sufficient of the basic principles of climatology, that are of interest to the geographer, have been treated to make it worthwhile publishing the results. Additional exercises, based on the same concrete methods, can be devised by the interested reader to suit his own purposes. It is suggested, however, that he make them available in print for the benefit of others.

A sequent series of several of the exercises is given below:

CONTINENTAL VS. OCEANIC TYPES OF CLIMATE

I. *Necessary Materials:* outline map of world; graph paper.

II. *Introductory Note:* Areas having an "oceanic type of climate" experience relatively small seasonal changes in temperature *for their latitude;* those having a "continental type of climate" experience great seasonal differences in temperature *for their latitude.*

III. *Exercise:*

The following climatic data are for representative stations having either typical oceanic or typical continental temperature regimes.

1. Plot these data on the graph paper supplied.
2. Also, locate each station on an outline map of the world.

STATION	*J*	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*
Seattle, Wash.	39	41	44	49	55	60	64	63	58	51	45	41
Winnepeg, Can.	−4	−1	15	39	52	63	66	63	54	42	22	7
Fairbanks, Alaska	−15	0	10	29	47	59	61	55	43	25	1	−7
Juneau, Alaska	27	30	34	41	48	54	57	55	50	43	35	31
San Francisco, Calif.	50	52	54	55	57	59	59	59	61	61	56	51

STATION	*J*	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*
Kansas City, Mo.	28	31	43	55	65	74	78	77	69	58	44	33
Los Angeles, Calif.	55	56	58	59	62	66	70	71	69	65	61	57
Santa Fe, N.M.	29	33	40	47	56	65	69	67	61	50	39	31

Compare the latitude and the mean annual temperature range for each of the following groups of stations:

a) Seattle: lat.? ..... temp. range? ..... type of climate? .....
Winnepeg: lat.? ..... temp. range? ..... type of climate? .....
b) Kansas City: lat.? ..... temp. range? ..... type of climate? .....
San Francisco: lat.? ..... temp. range? ..... type of climate? .....
c) Los Angeles: lat.? ..... temp. range? ..... type of climate? .....
Santa Fe: lat.? ..... temp. range? ..... type of climate? .....
d) Fairbanks: lat.? ..... temp. range? ..... type of climate? .....
Juneau: lat.? ..... temp. range? ..... type of climate? .....

Explain the conclusions you reach in considering the above data.

AREAL DISTRIBUTION OF TEMPERATURE OVER THE EARTH'S SURFACE; ISOTHERMS AND ISOTHERMAL CHARTS

I. *Necessary Materials:* copies of the January and July isothermal charts of the world.

II. *Introductory Note:* The three major factors influencing the trend of isotherms on isothermal maps are: (1) latitudinal variations in insolation, (2) differential heating and cooling of land and water, and (3) ocean currents.[1]

III. *Exercise:*

Answer the following questions with the above factors in mind:

a. Why do the isotherms on both charts in a general way trend east-west rather than north-south? *Explain* your answer.

b. By comparing the trend of the isotherms that lie between latitudes 40°N. and 60°N., and longitudes 60°W. and 160° W., on both the January and the July charts, we find proof of the statement that "land heats and cools more rapidly than water." *Explain* this proof.

c. By noting the trend of the 50°, 30°, and 10° isotherms along the western coast of Europe in the January chart would you say that coast was bordered by a cold or a warm ocean current? *Explain* your answer. Name the current. Do the same for the 50°, 60°, and 70° isotherms that border the west coast of South America in the July chart. The same for the 60° and 70° isotherms along the west coast of North America in the July chart.

d. How do you account for the fact that the 30° isotherm in the Southern Hemisphere of the July chart is the most regular of all on that chart (i.e., it has the fewest "kinks" in it, the least deviation from a true east-west direction)? *Explain* your answer.

e. Locate the three areas enclosed by 90° isotherms in the July chart. These areas are the warmest regions on earth during that month. Are they in the Northern or the Southern Hemisphere; over land or over water; in low latitudes or high

[1] The influence of altitude is generally omitted thru mathematical adjustments.

latitudes? Are they located where you would expect them to be or not? *Explain* your answer to this question fully. Compare with the two areas bounded by 90° isotherms in the January chart. *Explain* the location of these two hot areas for that month.

f. The 30° isotherm follows the 60° parallel in the Southern Hemisphere on the July chart (winter for that hemisphere), whereas the 0° isotherm follows (very roughly, it is true) the 60° parallel in the Northern Hemisphere on the January chart (winter for that hemisphere). *Explain* the difference.

g. Observe both the January and July charts carefully and locate the coldest region in the world (outside of Antarctica). By what isotherm is it bounded? Is it located where you would expect to find it? *Explain* your answer to this last question.

ABSOLUTE AND RELATIVE HUMIDITY; RAINFALL CHARACTERISTICS OF THE PLANETARY WIND SYSTEM

I. *Necessary Materials:* outline map of the world.

II. *Introductory Note:* The following material will help you obtain a better understanding of the principles involved when changes in the relative and absolute humidity of air take place. In addition it serves to emphasize the rainfall characteristics of the various wind-belts of the Planetary Wind System. The tables below contain all the data necessary to complete the exercise.

1. *Table of Moisture Holding Capacity of Air at Various Temperatures*

(Figures approximates)

Temperature of Air —F.	30°	40°	50°	60°	70°	80°	90°	100°
Grains of Moisture per cubic foot when saturated	2 gr.	3 gr.	4 gr.	6 gr.	8 gr.	11 gr.	15 gr.	20 gr.

2. *Conversion Table:* 1 cubic mile is equivalent to about 150 billion cubic feet.

3. *Scale of Map:* 1 inch = ... ? miles.

III. *Exercise:*

A theoretical cubic mile of air travels over the route given below—always retaining the form of a perfect cube and never becoming mixed with other air. (Note: draw path of the cubic mile of air on an outline map of the world, using solid lines for movement *along the earth's surface,* and dashed lines for movement in the *upper atmosphere.*)

Assume the cubic mile of air originally begins moving in the middle of the North Atlantic, at lat. 30°N., long. 30°W. Its temperature is 70°F. and it has a relative humidity of 50%. (1. How many grains of moisture are contained in each cubic foot of air? ..... 2. What is the total moisture content of the cubic mile of air in grains? .....)

As the air moves in a straight line southwestward toward lat. 10°N., long. 55°W. its temperature increases at the rate of 1°F. for each degree of latitude it approaches the equator. At the same time, as it blows over the warm tropical waters, it picks up 3/10 of a grain of moisture per cubic foot of air per 100 miles. (3. What is its absolute humidity at lat. 10°N., long. 55°W.? ..... 4. Its relative humidity? ..... 5. The temperature of the air? ..... 6. The total moisture content of the cubic mile of air in grains? .....)

At lat. 10°N., long. 55°W. it reaches the Equatorial Calm Belt and rises vertically a sufficient distance to precipitate ½ of its total moisture content. (7. *About* how many miles does it have to rise, assuming the adiabatic cooling rate was 3.0°F. per 1000 feet rise? ..... 8. What is its relative humidity at that elevation? ..... 9. Its absolute humidity? ..... 10. The temperature of the air? ..... 11. How much rainfall, in grains, fell on the square mile of ocean below the cubic mile of air? .....)

Upon reaching that elevation, the cubic mile of air becomes part of the "Antitrades" and moves northeastward in a straight line and at the same altitude toward lat. 30°N., long. 45°W., its temperature remaining constant. (12. What is its relative humidity at lat. 30°N., long. 45°W.? ..... 13. Its absolute humidity? .....)

At that point it becomes part of the Tropical Calm Belt and begins to descend vertically, being adiabatically heated at the rate of 3.0°F. for each 1000 feet descent. (14. What is its relative humidity when it reaches sea-level? ..... 15. Its absolute humidity? ..... 16. If rainfall occurred, how much in grains? .....)

At sea-level in lat. 30°N., long. 45°W. the cubic mile of air becomes part of the Westerly Wind Belt, blowing along the surface of the ocean in a straight line toward lat. 50°N. long. 2°W. As it moves northeastward it picks up moisture from the ocean at the rate of ¼ grain per cubic foot of air per 100 miles, while its temperature decreases 1°F. for each degree of latitude it approaches the pole. (17. *About* how many miles must it travel from lat. 30°N., long. 45°W. before precipitation begins? ..... 18. *About* what will the temperature of the air be at that point? ..... 19. What will be happening to its relative humidity as it approaches that point? ..... 20. To its absolute humidity? ..... 21. What will be happening to its relative humidity *after* it has passed that point? ..... 22. To its absolute humidity? ..... 23. How much moisture in grains will have been precipitated by the time the air reaches lat. 50°N., long. 2°W.? ..... 24. What will its absolute humidity be at that point? ..... 25. Its temperature? .....)

Using the preceding cubic mile of air as an illustration, *explain why* the Trade Wind and Tropical Calm Belts are "drying belts," while the Equatoriar Calm Belt and the Westerly Wind Belts are "belts of precipitation."

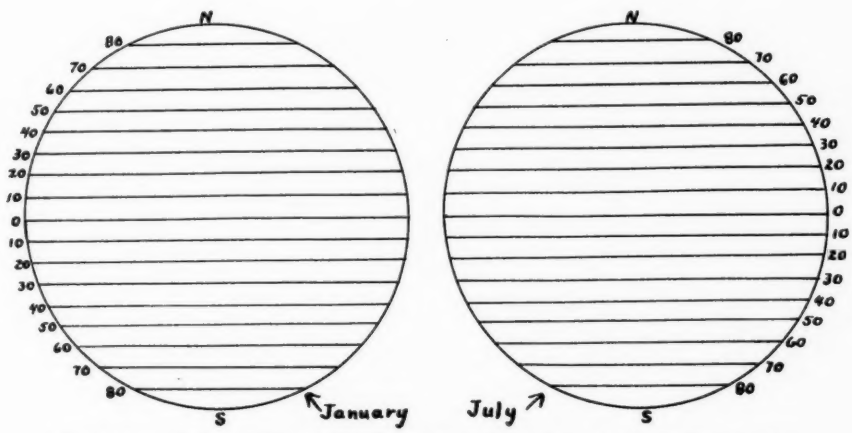
Seasonal Shifting of the Planetary Wind Belts

I. *Necessary Materials:* red and blue colored pencils.

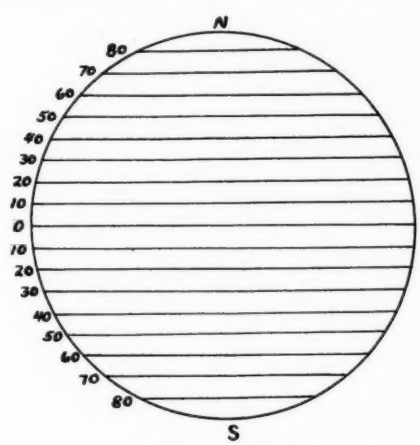
II. *Introductory Note:* The seasonal shifting of the various wind belts of the planetary wind system, under the influence of the changing sun's rays, produces drastic seasonal differences in the rainfall of certain parts of the earth's surface.

III. *Procedure:*

On the two outline worlds below draw the boundaries of the various wind-belts for January and for July respectively, using the following data. After the boundaries are completed, color the Equatorial Calm Belts solid red, and the Tropical Calm Belts solid blue. Cover the Trade Wind Belts with red dots, and the Westerly Wind Belts with blue dots.



On the outline world below shade all those latitudinal belts that lie in two of the planetary wind-belts during the course of a year. (Obtain necessary data from your drawings above.)



Describe in detail: (1) the changes in wind direction, and (2) the changes in rainfall that will occur during the course of a year in each of the individual latitudinal belts you have shaded.

Latitudinal Extent of the Planetary Wind Belts

Wind Belt	*January*	*July*
Equatorial Calms	5°N. lat. to 15°S. lat.	15°N. lat. to 5°S. lat.
N.E. Trades	5°N. lat. to 20°N. lat.	15°N. lat. to 30°N. lat.
S.E. Trades	15°S. lat. to 30°S. lat.	5°S. lat. to 20°S. lat.
Trop. Calms (N. Hemisphere)	20°N. lat. to 30°N. lat.	30°N. lat. to 40°N. lat.
Trop. Calms (S. Hemisphere)	30°S. lat. to 40°S. lat.	20°S. lat. to 30°S. lat.
Westerlies (N. Hemisphere)	30°N. lat. to 60°N. lat.	40°N. lat. to 70°N. lat.
Westerlies (S. Hemisphere)	40°S. lat. to 70°S. lat.	30°S. lat. to 60°S. lat.

(Note: these figures are only approximates. The exact latitudinal extent of each belt varies widely from place to place.)

Conclusions

The author feels that the method of approach employed in the above exercises is unique. Vague generalized questions are avoided. Consequently, evasive answers cannot be given. The specific questions asked demand specific answers. The student cannot work the exercises without definite knowledge of the subject being treated.

Another advantage is that mimeographed copies of the exercises are easily and cheaply made. The expense to the student or to the institution is thus reduced to a minimum.

For the past two years the above exercises, and additional ones of a similar nature, have been in use in the author's classes at the University of Cincinnati. The results achieved appear to be most satisfactory. It is hoped that others may find equal value in their use.

A METHOD OF TEACHING DAILY TIME ADJUSTMENT TO EARTH ROTATION

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The child cannot bridge the gap, over which teachers often attempt to take him, between his ideas of his natural environment and principles of mathematical geography. Clear geographic concepts and an understanding of terms used in connection with them can be developed by beginning with things as they seem to the child and guiding him step by step toward mental images that are broader and more nearly true. In assisting the pupil to acquire such knowledge of geographic relationships the teacher should provide him with opportunities for many concrete experiences.

The following outline indicates one plan for guiding junior high school students in the development of meaningful concepts of how we adjust our time system to earth rotation.

How We Adjust Our Time System to Earth Rotation

A. Developing the concept of the meridian (Lesson One)

1. Take the pupils to observe a sundial at noon (sun time). Place a compass beside the dial and discuss any difference between the "norths" on the two instruments. (For a few days preceding this lesson the children have watched a shadow stick and noticed that the shadow lies to the north of the stick at noon and is shortest at that time. From previous work they understand that the geographic poles and the magnetic poles are located at different places, and know the approximate magnetic declination in their locality. At Duluth, the declination of the compass needle from true north is so slight that it need not be considered in this lesson. At some places in the United States, however, the declination from the true meridian is great enough to make correction advisable. A map showing the isogonic lines for the whole United States can be found in Johnson's *Theory and Practice of Surveying* or can be obtained from the Superintendent of the United States Coast and Geodetic Survey, Washington, D.C. If there is no sundial on or near the school grounds, the teacher and children may make one by following the directions given in the *Encyclopaedia Britannica* or in *Sun-Dials and Roses of Yesterday* by Alice Moore Earle. Always examine a sundial to ascertain whether or not it is constructed for

the latitude of the locality. The gnomon of an ordinary horizontal dial must rise from the face at an angle equal in degrees to the distance from the equator.

2. Let one pupil hold the compass and, if it seems advisable, make the correction to get approximate true north-south. Then have this child face the south while the rest of the children of the class stand in line behind him, each standing on the shadow of the head of the child next in front. (Take a picture of this human meridian for future reference.)

3. Explain that, if there were enough children, a line might extend from one pole to the other.

4. Introduce the term "meridian" explaining that all people along one meridian have noon at the same time.

5. Guide pupils in properly orienting a map of North America with straight meridians onto a flat sunny surface, so that the shadow of a shadow stick makes a meridian line on the map across the place where the local community is represented. Lead the pupils to see that the shadow coincides with the meridian lines on the map.

6. Ask pupils to point out map locations of places which lie on the meridian indicated

by the shadow, being sure that all the children realize that noon occurs at the same time in all of these places.

(This lesson should be divided and taught on two different days so that it may be carried out while the sun is in the noon position.)

7. Summarize the lesson, making certain that no misconceptions remain.

B. Developing the concept of meridians (Lesson Two)

(Children may possess a clear idea of the meridian passing thru their locality and yet have almost no conception of other meridians.)

1. Push the seats to the wall and divide the pupils into five groups. Have the members of each group draw a line on the floor to simulate a meridian as on a map projection which has parallel meridians, using a compass to insure approximately north-south lines. Allow two or three children to draw an east-west line thru the center of the room to represent a sector of the equator.

2. Direct members of each group to stand well distributed along their line.

3. Pull window shades to shut out natural light. Take a powerful electric light on an extension cord and fasten it to a long window stick. Move the light from east to west along or parallel to the line analogous to the equator while children on the "meridians" point to the improvised sun as it is passed slowly across the room. Before the light is passed across the second time, ask the pupils what really happens when the sun disappears from sight in the west. Lead the children to notice when "noon" occurs for those on each "meridian" and discuss the direction of the shadows of children at "noon." Also let them see that the shadow is shortest at noon and that a child under the vertical rays points straight up at the "sun" at that time and has a shadow only in a spot around his feet. Introduce terms "oblique rays of the sun" and "vertical rays."

4. Discuss "before noon" and "after noon" as it applies to each row of children.

5. Consider with pupils the practically unlimited number of meridians that are possible compared to the number commonly used on maps.

6. Direct children in examining the meridians on the globe. Demonstrate rotation of the earth, showing, thru the use of light, how the sun's rays fall on the earth and discussing noon time on certain meridians. (At this time the earth is represented as rotat-

ing and the sun as remaining stationary. When transferring the view point from the seeming to the real, a child does not feel confused if reminded of some simple experience, such as his imagining that the train he is on is moving in one direction only because the train next to his is moving in the opposite direction.) Now a curved surface with meridians converging at the poles enters, whereas, in demonstrations thus far, a flat surface with parallel meridians has served. In order to carry on the idea of the relation of the meridian to the noon shadow, set upright pegs along two or more meridians. Each peg may be temporarily stuck to the globe with a small amount of paraffin.

C. Developing the concept of the solar hour and the twenty-four hour day (Lesson Three)

1. Draw circles on the board and review the fact (previously studied in arithmetic) that every circle contains 360 degrees. Apply this to the equatorial circumference of the earth.

2. Turn the globe on its axis to demonstrate the relation of the time system to earth rotation and, while carrying on discussion, ask how many hours are required for one rotation.

3. Lead pupils to see that noon time passes the whole distance around the earth, or 360°, during one earth rotation, or day. Now ask how many degrees noon time passes westward in one hour. (Here some teachers may wish to explain that twenty-four is a number of hours arbitrarily set by man and, that therefore, while the length of day is governed by natural phenomenon, man controls the length of the hour.

4. Direct pupils' attention to globe and maps on which meridians are fifteen degrees apart.

5. On the floor, draw a very large map of North America with meridians at 75, 90, 105, and 120 degrees west longitude. Have pupils stand at intervals along each of these meridians and, while using the light to cast rays representing the sun's rays, discuss the relation between the solar hour and the number of degrees from one meridian to another.

D. Developing the concept of Standard Time (Lesson Four)

1. Have pupils notice any difference between noon by the sundial and twelve o'clock by watch time. The question of why there

is a difference will naturally arise and lead toward the idea of need of a standard time system. (This condition, of course, will not be found at the center of the Standard Time Belts and, therefore at those places, the procedure should be somewhat modified.)

2. Return to the classroom and discuss disadvantages in the use of local sun time and the consequent need of another system for keeping time. Some examples of situations in which regulating our activities by local sun time is inconvenient are those which require: a. constant regulation of the watch or other time keeping device by people traveling east or west; b. keeping of appointments with those at points of different longitude from one's own; c. making a time schedule for trains running east and west.

3. Lead the children in discussion of possibilities for devising a time system more convenient than local sun time. Guide them toward the conclusion that a good plan is to change the hour of the clock at a point half way across a distance of fifteen degrees from certain meridians chosen to establish the even hour, thus making belts in which the same time is used for an area fifteen degrees in width.

4. Let the pupils plan where the borders of such belts should be drawn on their floor map of North America and then draw them in dotted lines.

5. Suggest that the children stand on meridian lines with one child at the end of each facing the center, while the rest face him. Give a pasteboard clock with movable hands to the child at the end of each line and let him move the hands to show how the time changes in the belts represented. As the improvised sun moves across the map and the time keepers regulate the clocks, the other children should feel responsible for drawing attention to any errors.

6. Next have some of the pupils stand off the meridian lines. Let the class decide, both in terms of sun time and Standard Time, what time it would be at the places in North America represented by the spots where each child stands.

7. In the discussion introduce the terms "Standard Time" and "Standard Time Belts."

8. Tell the pupils that no standard time belts existed until the 1880's, when the coming of the railroads brought the realization of the need for a standard time. In those days people used local sun time and at first each railroad took the time of its headquarters. In 1883 the railroads of the United States ran on fifty-three time

systems and at one junction there were often several of them in use. In that year the railroads agreed to adopt the local time of certain "standard" meridians that are multiples of fifteen. In 1884 at a conference in Washington, D.C. the Greenwich meridian was chosen as the reference or Prime Meridian for the world.

9. Give a short drill on estimating Standard Time in relation to distances east and west of Greenwich.

10. Show a map of Standard Time Belts in the United States and Canada, such as, the map on page twenty-nine in *Principles of Human Geography,* Fourth Edition by Huntington and Cushing. This map has clocks comparing time in each belt with that at Greenwich. Draw class attention to the appropriateness of the names of the four time belts of the United States.

11. Examination of the map will naturally bring out the question of the reason for the irregular shape of the belts. Explain that railroads prefer to change time at division points.

12. Give a short drill on comparing the time at cities in different time belts of the United States. (This lesson often leads to questions that call for an explanation of the International Date Line.)

E. Application of concepts and principles in various motivated drills

Two examples of drills used:

1. Tuning in on imaginary radio broadcasts
2. Finding longitude of imaginary ships at sea by comparing the sun time and the time shown on the ship's chronometer.

TEACHING CONSERVATION OF RESOURCES

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THE CONSERVATION PROBLEM

One of the most challenging problems before the American people today is that of conserving national resources.[1] What challenges the nation must perforce also challenge education, but so far, the schools in general have been curiously apathetic to the matter. There is needed, therefore, a vigorous educational program based upon clear-cut objectives.

On all sides, in every state in the Union, are evidences of waste, unjustifiable destruction, selfish exploitation, and senseless misuse of resources, both physical and human. A partial list of these includes: droughts, floods, dust storms, soil erosion, land exhaustion, forest fires and devastated timber areas, depletion of fish and game species, polluted beaches, lakes and streams, distressed tenant farming (at its worst approaching "Tobacco Road" conditions), abandoned railways, decay of rural communities, urban slums and blighted areas, submarginal and abandoned farms, stranded industrial communities, closing of rural schools, overproduction of certain crops and minerals and manufactured goods, industrial waste, scarcity of certain raw materials, unemployment, child labor and industrial peonage, increasing highway and street congestion, mounting traffic accidents, billboards and other unsightly objects disfiguring the landscape beauty, commercialization of scenic areas, and unwise land subdivision.

In a totalitarian state these probably constitute a problem only for the governmental heads, but in a democracy where responsibility for action resides in the citizenry, the task of seeing that the citizenry is an enlightened one, and that remedial action is initiated, devolves upon education.

THE PROGRAM FOR HIGHER EDUCATION

There is considerable danger that conservation may be made a partisan political issue before there can be developed a thoro public appreciation of the problem to lend it support and give it direction. Education at the tertiary level must act promptly in

[1] Abstract of a paper read before the National Council of Geography Teachers, Cambridge, Massachusetts, December 27, 1938.

order to send out annual waves of graduates capable of thinking and acting in an enlightened manner with regard to the local, state, and national aspects of conservation. In achieving this, junior colleges, colleges, normal schools, teachers colleges, and universities need to cooperate each in its own way under a possible National Committee for Conservation Education.

Each of these several types of institutions may contribute in an important way to the total program, but the teachers college is perhaps the most crucial link in the entire chain, for from it the larger number of future teachers will be recruited. In the teachers college, conservation might well be made a part of the entire social studies program. Not only should it form an integral part of the subject matter courses in social science, but should also be injected as a motif in the general course in social foundations of education. A special opportunity exists for the department of geography to develop a course dealing entirely with the subject of conservation. For a number of years, colleges and universities have offered such courses wherein one after another the several major categories of natural and human resources are examined, the history of their exploitation traced, and programs for more rational use suggested. A public educational program, however, would seem to demand a teacher training course of somewhat different character. Less attention should probably be accorded the historical and scientific study of specific resources, and less time spent on the technical aspects of the remedial program. Real stress on the other hand, should be placed upon seven things:

1. The social objectives of conservation.
2. How to achieve these thru education.
3. How to get conservation into the school, the home, and the community.
4. How to organize subject matter into units suitable for use in the classroom.
5. How to introduce and motivate this material, and how to integrate it with the other phases of work in the school.
6. How to thoroly explore the child's experience so as to determine what be his attitudes toward conservation problems.
7. How to present the child with learning situations which will elicit and fix the sort of attitudes which should carry over into adult life.

As a sequel to the conservation course it would seem to be desirable to offer an advanced course dealing with "Education and the Planning Movement." This should treat the necessity for, the possibilities in, and the attempts at community, state, and national planning for resource use. It is not enough to show the teacher-in-training what is wrong and what ought to be done; he should

be shown how to do it. Actually, this latter must be a giant public program involving city and rural community, county, state, interstate region, and nation. Planning at every civic level is already under way, some of it good, much of it ill-advised. All of it, good or bad, has a bearing upon making the community a better place in which to live, and upon determining whether the future use of resources will be adequate or inadequate.

Quite aside from instruction of this kind, a considerable amount of conservation education can be achieved incidentally in connection with other courses offered by the geography faculty in the teachers college. The "methods" classes in geography teaching for elementary, secondary, and normal school teachers, may feature conservation and community planning in their training programs. The subject matter courses, such as the "Principles of Geography," "Economic Geography," and "Regional Geography of North America" may also introduce the conservation motif. All told, there is here indicated a very large opportunity for sensitizing the teacher to the need for conservation education, and thru him for reaching the next generation of American citizens.

OBJECTIVES IN CONSERVATION EDUCATION

The general aim or purpose of conservation education is to bring about a situation where society will consciously adopt, enforce, and maintain a rationalized and, as nearly as possible, self-perpetuating program of resource use. For this, the following specific goals or objectives are tentatively suggested:

1. *To sensitize the individual to evidences of resource waste and misuse,* to which he is usually insensible because he has been "conditioned" to them since birth.
2. *To create geographical habits of thinking,* that is, the practice of regarding social situations, political events, and economic institutions as being related to resources.
3. *To secure new laws relating to resources,* in place of the present ones which usually do not even permit or allow conservation.
4. *To develop new customs and practices,* to replace long established defective practices and customs in dealing with resources which are universal in America, such as:

   Subdividing and cultivating land rectangularly.
   Burning-over grassland, woodland, and idle areas each spring.

Despoiling trees, shrubs, and flowers for trivial reasons.
Dumping trash and rubbish into ditches, roadsides, and other unoccupied places.
Treating all edible wild life as legitimate prey for man.
Using creeks and rivers for sewers.
Despoiling landscape beauty for "practical" reasons.
Allowing our communities to be designed by ignorant or self-centered real estate dealers.
Allowing beaches, waterfronts, and other natural recreational resources to be preempted by private ownership, etc.

5. *To cultivate a new ideology regarding resources,* as for example:

Resources are not inexhaustible.
We are stewards or trustees of the earth's riches—not owners.
Public ownership of resources is in some cases a higher form of ownership than is private possession.

6. *To cultivate a new community ambition,* not to grow larger and hence to use more resources, but to make more ample use of the ones used and consequently to make the community a better place in which to live.
7. *To develop a sound basis for conserving human resources,* particularly in the application of the principles of human biology to education, economic reward, and social security.
8. *To create a new social philosophy of rights,* as for example to cultivate the idea that no person, or group, or community actually has a "right" to use any resource in any manner inimical or damaging to any other person, group, or community.

THE PROGRAM FOR SECONDARY EDUCATION

At present the secondary school is the weak spot in our educational system. Its objectives are in a state of flux and its curriculum is in a condition of indirection and indecision. It does, however, exhibit two fairly stable aims: (a) to challenge and interest the youth, and (b) to train him for democratic citizenship. In attempting to comply with these aims, there has been much curriculum reorganization based upon loose thinking about "Problems of Democracy," and "Centralizing Themes in Modern Social Life." Well meaning tho this thinking be, it has been far too generalized and has remained pretty much "up in the air." Conservation, on the other hand, comes specifically down to cases. Consequently, it offers four distinct challenges to the high school program:

1. How man uses resources to build civilization.
2. The United States as a national property.

3. How we have wasted and destroyed our resources.
4. Planning a permanent United States.

As such it is both a crucial problem of democracy, and a fundamental centralizing theme of modern life. It is even more than these, it is in its larger aspect a "way of life" which our nation must adopt or else enter upon an inevitable decline. In many high schools where active curriculum revision is under way there will be an opportunity to organize a complete course in conservation. In others, at least one unit in conservation can be taught in connection with the commercial geography or social studies course.[2] Furthermore, conservation can and should be made the centralizing theme for most geography work at this level. A course in social or commercial geography for the high school which does not focus sharply upon this motif is poor stuff indeed. And yet only a few weeks ago, a new secondary school geography appeared which makes almost no mention of the matter. In contrast to this, a high school text did appear in 1937 which made conservation one of its three central motives. The result is so stimulating as to give promise of completely remaking geography at the secondary level.

THE PROGRAM FOR ELEMENTARY EDUCATION

The program needed for the elementary school was admirably summarized by Edwin H. Reeder when he remarked that "Many people who are interested in conservation are attempting to introduce special courses in it into the elementary school. In my judgment this is not feasible; the elementary school program is already overcrowded with subjects. What is needed is not conservation as a subject, but conservation emphasis in teaching already existing subjects. American history is too often taught as the story of a triumphal march illustrating man's subjugation of Nature. Geography, both of the United States and of other countries is usually taught without emphasis upon or reference to the conservation of resources, and yet there is scarcely a country in the world which is not facing the problem in a major way. We need to fill our teachers-in-training so full of the conservation idea that whether they are teaching the westward movement, or the settlement of Texas, or the growth of the Middle West, or the regional geography of New England, China, or Europe, they will be giving the children ideas about this important subject."

[2] See the writer's paper, "Conservation As a Unit of Study in Geography," *Education*, January, 1938.

It might be well to point out at this time that in connection with community study there is an especial opportunity for developing work in conservation and local planning. This is a natural core for such work, and may well replace the rather labored themes now in use.

The Implications for Geography

Every subject must have something both vital and specific to contribute to education or it will sooner or later be pushed out of the modern school curriculum. This generalization is an operative truth to which geography as a school subject has no immunity. And yet thruout most of its academic history, geography has never been very specific as to content or philosophy, and seldom has it been very vital. To be sure, under the leadership of Davis it became for a time highly specific, but as physiography its focus lay too far from the center of its field to receive continued support. Nearly two decades ago, Barrows suggested that it be reshaped as human ecology, but this concept has not been cultivated very diligently. And so, at present, geography continues to be in most instances a pleasant generalized descriptive study, possessing educational importance principally in the eyes of those who teach it.

Today in America there are in operation a number of powerful forces which promise to remake almost entirely our basic human geography. These have given rise to a whole set of exceedingly important problems, most of which are embedded in such areas of investigation as: community study, urbanism, city planning, regionalism, industrial location, urban-rural migration, selective factors at work in human biology, decadence and blighting of localities, population resettlement, socio-economic planning, and conservation of national resources. Geography teachers and textbooks have in the main either ignored these problems or regarded them lukewarmly. At the same time they have largely occupied themselves with trivialities. At the elementary level, time and effort may be spent on learning how little folk live in far away lands, on Japanese cherry blossom festivals, or on the description of a bus trip around busy Manhattan, but little or no attention is paid to the all-important local community, nor to those resources which make human civilization possible. At the college level, attention may be lavished upon the ways of manufacturing steel, the bean industry of California, or the cabalistic minutiae of Köppen's clas-

sification of climates, while no mention is made of regionalism, national planning, or conservation. It is patent that geography must change considerably if it be to serve any very useful purpose. Should it not do so, it can hardly hope to survive long as an active educational instrument.

No matter how carefully it be defined or how elaborately its educational objectives be stated, any subject remains largely dialectics until it is harnessed to some task where it must be put to work. Conservation of resources is one of those tasks. Geography will do well to cultivate conservation, for it is by its nature peculiarly fitted to deal with the problem. Let us therefore begin at once to plant the seeds which will some day result in a great mass movement toward the preservation of the resources and amenities of our national area.

RAY HUGHES WHITBECK

1871-1939

American geographers lost a much-loved colleague and teachers of school geography a devoted friend thru the death of Professor R. H. Whitbeck in Madison, Wisconsin, July 27, 1939. Early in his career, Mr. Whitbeck devoted himself to the problems of the teacher. Later, when he turned his attention exclusively to the subject matter and teaching of geography, his early point of view was not forgotten. He was led inevitably to think and write as much for the teacher as for the broadening of scholarship and the accumulation of knowledge in his chosen field. It was his greatest satisfaction to write for students and teachers the striking descriptions and interpretations of geography, newly oriented, and stated with that simple clarity of which he was a master. His interest in his field and its teachers did not desert him when, at last, years of ill health forced him to bring his professional work to a close in 1936. One of his latest topics of conversation concerned the teachers of geography among his former students, inquiry as to their progress and hopes for their success.

Ray Hughes Whitbeck was born in Rochester, New York, April 2, 1871. His youth was spent in the hilly upland of southern New York where his father was a village merchant. He well knew the restrictions that limited financial means can impose on ambition. From this background he carried into later years the modesty and friendliness, the direct approach to all matters of policy, and the severe simplicity in taste and manner of life that were to characterize him to the end.

At the age of twenty-one he had finished the training course in the Geneseo, New York, Normal School and embarked upon his teaching career as the principal of a small seminary. This position held him four years. Two years of high school teaching followed and with them came the resolution to advance himself thru further study. In 1900 he entered Cornell University from which he obtained his A.B. degree in 1901 under the direction of the late Professor R. H. Tarr, a noted physiographer. Here, as departmental assistant, he had his first experience in college teaching and was at the same time thrown with a stimulating group of fellow students in geography and geology. In these surroundings it is not surprising that he acquired a background of physical geography

that later was to figure largely in his thought and writing. It is more surprising that here he developed the broad interest in human geography, political, social and economic, which his later writing was to show so abundantly.

Equipped with a special interest in geography and his teacher training and teaching experience, Mr. Whitbeck was called to the position of supervisor in the State Model School of New Jersey at Trenton. This place he occupied for eight years and meanwhile developed his knowledge of geography and acquaintance with geographers. It was during these years that he was elected to membership in the Association of American Geographers, of which body he was long after (1925) president.

In 1909 there came to him an opportunity which marked a turning point and gave direction to the remainder of his life. He was invited to the University of Wisconsin, particularly to develop work in the human aspects of geography; this in a department where the physical side of the field already was strongly represented. This appointment gave him greater freedom for studies and writing in his field of interest. Articles, bulletins of scholarly value and both high school and college textbooks of wide acceptance began to come from his facile pen. Almost immediately he accepted another and concurrent opportunity to be of service to geography and to teachers. In 1910 he assumed the editorship of THE JOURNAL OF GEOGRAPHY which he held until 1919. Released from editorial duties, he turned his attention to the geography of the Caribbean Lands and South America. Travel in both areas furnished him with data from which grew several papers and subsequently a textbook.

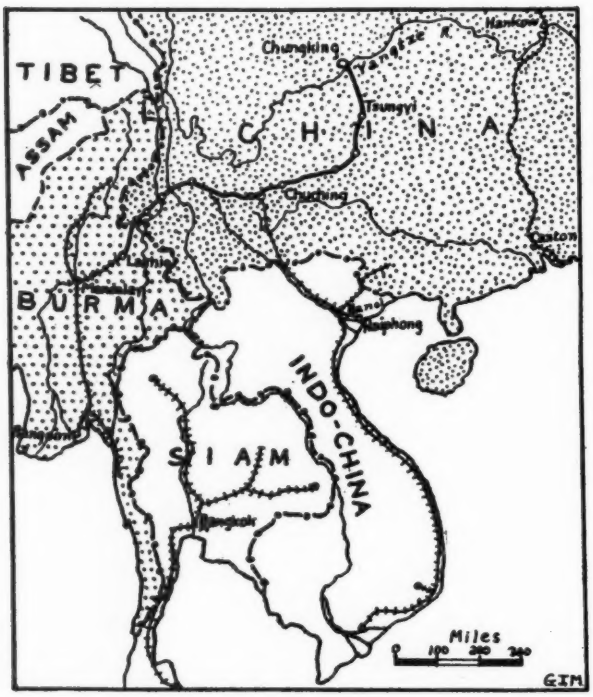
During the years of his active service Mr. Whitbeck touched the lives of hundreds of students. Of them all probably none were more appreciative of his kindness and insight than the harassed and poorly equipped teachers of geography who flocked into his classes. Especially was that true in the various summer sessions where he taught. It is expressive of his thought for them that half the summers of his teaching career of more than forty years were spent in the classroom. He was an important figure also in organizing the National Council of Geography Teachers and was its president in 1920. The Distinguished Service Award of the Council came to him as a great satisfaction during the recent years when it was necessary for him to give up the employment he most enjoyed.

VERNOR C. FINCH

University of Wisconsin

EDITORIAL NOTES AND NEWS

The next annual meeting of the National Council of Geography Teachers will be held at the University of Chicago, December 27 and 28, 1939. President Edwin H. Reeder is preparing a varied program which will be of interest to all geography teachers, whether elementary, high school, or college. Additional information concerning the meeting will appear in the October number of the JOURNAL and the full program will be issued in November. The Association of American Geographers will hold its annual meeting at the same place, thus offering an unusual opportunity for teachers of the middle west.



Japan has closed the front doors to China and General Chiang Kai-shek has opened the back doors in order to obtain supplies. The route from U.S.S.R. by way of Urumchi in Sinkiang and Lanchow in Kansu has been functioning for some time, altho it necessitated a 2,000 mile truck haul thru desolate terrain. The new route leading from Rangoon in Burma by way of Lashio, and Chuching to Chungking (see map) is now carrying supplies. The distance from Rangoon to Chungking is approximately 2,100 miles, about one-fourth of which is traversed by railroad from Rangoon to Lashio. This route is especially interesting because it is practically the same route followed by Marco Polo about 600 years ago. Thruout much of the western part of the route the highway passes thru rugged, mountainous, country and over numerous high passes. Its construction is, indeed, a remarkable feat when one realizes that it was built without the use of machinery. It is reported that as many as 120,000 laborers were engaged in construction operations at one time. It is probable that as many as 1,500 large trucks (3-ton) are now operating over this route.

The Federal Department of Agriculture has recently announced two new uses of lignin. Lignin is the waste product of wood when cellulose is removed to make paper and rayon. Its disposal has been a problem. Lignin is also available from any plant products such as cornstalks, wheat straw, bagasse and cottonseed hulls. According to the Agricultural By-Products Laboratory, Ames, Iowa, lignin from corncobs removes iron from hard waters more effectively than the commercial compounds now in use. The other new use was worked out at the Forest Products Laboratory at Madison, Wisconsin, where new substances have been produced by the addition of hydrogen to lignin under

heat and pressure. These substances have possibilities as insecticides, fungicides, preservatives, adhesives, solvents, and plastic.

DR. ALICE FOSTER, University of Chicago, taught the past summer in the geography department at Western Reserve University.

DR. G. DONALD HUDSON has accepted an appointment as Professor of Geography at Northwestern University. In the past five years Dr. Hudson has been with the Tennessee Valley Authority, first as Chief of the Geography Section and later as Chief of the Land Planning Division.

On June 24 the name of Siam was officially changed to Thai, meaning "free." The new name will probably appear on American maps as Thailand.

ROBERT M. BROWN is now Acting-President of Rhode Island College of Education. Professor Brown has been head of the department of geography for many years, is Past-President of the National Council of Geography Teachers, and a member of the editorial staff of the JOURNAL.

DR. CARL L. STOTZ has been appointed assistant professor of geography at the University of Pittsburgh and will assume his new duties this autumn.

According to a recent release from the Bureau of Mines, Canada's radium production is increasing rapidly. That of 1938 is expected to reach 40 grams. The company which owns and operates the mine and concentration mill at Great Bear Lake near the Arctic Circle mines about 125 tons of pitchblende a day. It takes about 40 tons of the ore to yield one ton of concentrates. The concentrates are shipped in the summer months in company boats operating on the Mackenzie-Great Slave-Athabaska Waterways to a rail head north of Edmonton from which it moves to the refinery at Port Hope. Ten tons of concentrates yield 1 gram of radium. For each gram of radium, Canadian pitchblende yields 7,800 pounds of uranium and 10,000 ounces of silver. Other by-products at the refinery are radioactive lead, copper, and cobalt. The company believes its reserves are valued at $15,000,000 adequate for 15 years.

Teachers College, Columbia University, is instituting an educational service to bring to the public information about the latest developments in education. Questions may be submitted to the Faculty Committee on Public Relations, Teachers College, Columbia University, New York City.

According to a Forest Service summary, Washington forests have supplied more lumber than those of any other state, having passed Michigan. The mill value of this Washington lumber is $3,200,000,000. Washington, Michigan, Wisconsin, Pennsylvania, Louisiana, and Oregon each has a total production record of more than 100 billion feet.

According to a recent release from the Department of Commerce, Congress has appropriated money to provide for scientific investigations in the production of tung oil in the United States. This rapidly expanding crop of the South, and the processing of its oil, will be studied jointly by the Bureau of Plant Industry and the Bureau of Chemistry and Soils. Foreign supplies of tung oil are subject to sharp fluctuations in price and to uncertainty as to its availability.

GEOGRAPHICAL PUBLICATIONS

Samuel Van Valkenburg, **Elements of Political Geography,** 401 pages, 101 illustrations. Prentice-Hall Inc., New York. 1939. $3.50.

Elements of Political Geography serves as a text for the introductory course offered to undergraduate college and university students. The book is divided into seven parts, listed in order, they are: (the number of pages devoted to each is in parentheses) The Political World, (28); France: A study in Political Geography, (62); The Physical Elements, (76); The Economic Elements, (66); The Human Elements, (78); Colonies, (52); and Conclusion, (10). At the back of the book is a very useful bibliography.

This book will greatly influence the teaching technique of political geography as well as offer a real philosophical understanding of the subject to students and laymen alike.

The two general methods of organizing political geography material are by countries or by geographic elements. Dr. Van Valkenburg's use of the latter method makes it possible for him to amply illustrate the influence of geographic elements upon political activities.

In order that students may not forget that states function as political units, the author analyzes France from all angles of political geography, and gives a perspective of the complex integrating factors of political geography within a political unit. This type study helps students to formulate a functioning approach to world problems, critically evaluate printed material, and grasp the potent influence of natural phenomena and environment upon political problems and activities.

It is fortunate for college and university students, teachers, and the field of geography in general, that there is available at this time a text introducing the elements of political geography. Interest in this subject is acute because of territorial changes. These same changes, however, also make changes in textbooks necessary.

THOMAS F. BARTON

State Normal University
Carbondale, Illinois

A. E. Parkins and J. R. Whitaker. **Our Natural Resources and Their Conservation.** 631 pp. Illustrated. John Wiley & Sons., Inc., New York City. 1939. $4.00.

This is the second edition of a volume that gained preëminence in its field when the first edition appeared. It is the joint work of twenty-three contributors. The new edition has been entirely revised so as to include latest developments in the field of conservation. A new chapter—"Fisheries for the Future"—has been added. Thruout the volume the authors have maintained a non-technical and readable style with very little duplication of material.

Gayle Pickwell. **Deserts.** 174 pp. 64 full-page photographs. Whittlesey House. New York City. 1939. $3.50.

This remarkable volume, consisting of descriptive text and excellent photographs, is "The story of a little-known world where living things, in a stubborn fight for life, assume beautiful and unusual forms." To those who have traversed the desert and been enchanted by its strangeness, grandeur, sereneness, cruelty, and fascination, will likewise be enchanted by this volume. To those who have never felt the spell and charm of the desert the book will open a new world.